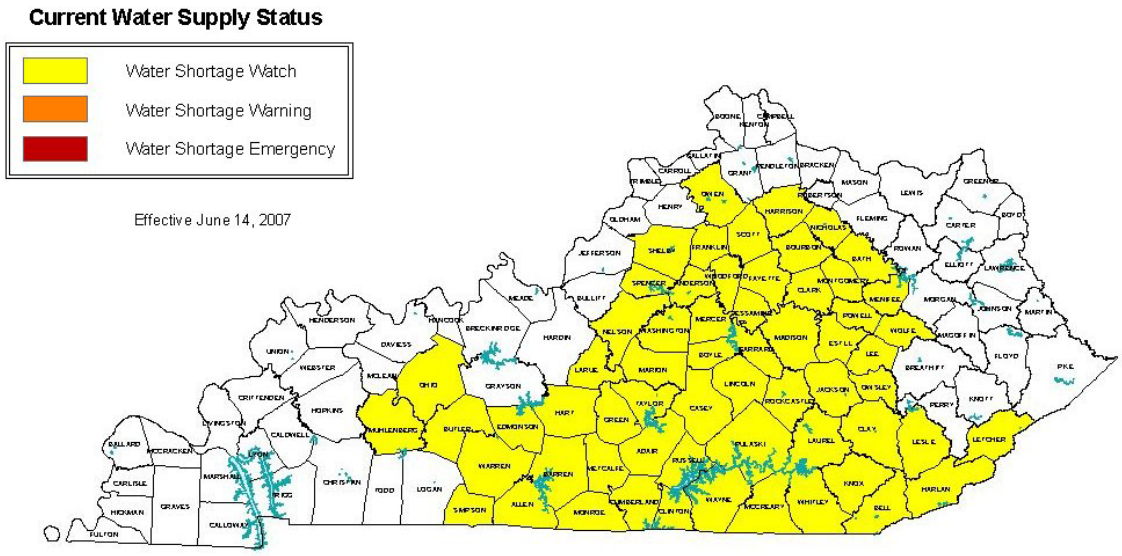
Kentucky Drought Monitoring Center

Select from the sidebar to view drought information.



Statewide Summary of Drought Development

Current for the week of June 11, 2007

UPDATE June 15 - State Declares Water Watch Shortage for 61 Counties (To view press release please click here.)

Kentucky is currently experiencing moderate to severe drought conditions as a result of a substantial deficit in precipitation that has been accumulating since November 2006. **At the present time, there have been no reported shortages at water supply intakes**. However, there have been at least 12 reports of high water demands overwhelming the ability of water suppliers to treat, store and distribute potable water to customers. These have occurred around the Memorial Day weekend in the following counties: Bourbon,

Casey, Estill, Garrard, Grant, Harrison, Mercer, Pulaski, Russell, Scott, Shelby and Woodford.

The outlook for the next eight to 14 days indicates above-normal temperatures and low to below-normal precipitation. Under these conditions the potential for unsustainable demands from water customers can overwhelm a water supplier's ability to treat, pump or store adequate quantities of potable water. **Now is the time to consider limiting outdoor water uses to those that are essential for the survival of landscaping, trees or new plantings.** Refrain from car washing, hosing down of sidewalks and patios, and large-scale watering of lawns that are browning and entering dormancy from the unusually dry conditions.

Useful Drought Indicators

PRECIPITATION

Since the beginning of 2007, rainfall deficits have continued to build across Kentucky, culminating in May with an unusual 12- to 15-day period during which no beneficial rains fell. The month of June has begun with a substantial deficit in place ranging from 6 to 10 inches with more severe deficits located in the southern regions of the Western, Central, Bluegrass and Eastern climatic divisions. The accumulated rainfall for the months February through May rank among the top five driest in 113 years of instrumental recording for all four climatic divisions.

Showers and thunderstorms last Tuesday and Friday brought some beneficial rains of 0.50 to 1.0 inches to areas east of a line stretching from Jefferson County (Louisville) southeast to Wayne County (Monticello). To the west of this line, precipitation amounts were only 0.25 inches or less.

STREAMFLOWS

Streamflows have generally been in the low to below-normal range for most of the February through May "spring" period. For the week of June 11 there are large areas of severely low flow but also some areas where flows are low but still within a normal range for this time of year. Current daily streamflows indicate normal to low-normal streamflow conditions in the Kentucky, Lower Cumberland, Mississippi, Tennessee, Big Sandy, Little Sandy and Tygarts river basins. Moderate-to-severe low flows are observed in the Upper Cumberland, Salt, Licking and Green river basins.

LAKE ELEVATIONS

Most small water-supply lakes are not heavily impacted at this time. Lakes under the control of the Huntington District, Louisville District and Nashville District of the U.S. Army Corps of Engineers continue to operate along their normal lake elevation curves. Two exceptions are the Barren River Reservoir in Barren County and Rough River reservoir in Breckinridge County. Barren River reservoir is having difficulty bringing the elevation to normal pool and is currently down by 7.5 feet. Discharges from the dam have been at or near the minimum release since March 20, 2007. Similarly, Rough River reservoir is 1.9 feet below normal pool and has been at or near to minimum release since March 16, 2007. Releases from Corps of Engineer reservoirs are important to the status of many Kentucky rivers as sources of supply for drinking water, assimilation of wastewater discharges, water quality and aquatic habitat. These rivers include the Green, Barren, Rough, Nolin, Kentucky, Salt, Licking and Big Sandy rivers.

Drought Monitoring

Drought is a natural and recurring feature of our climate that can be considered a "severe" weather event much like a tornado, a flood or a hurricane. However, there are a few key differences that distinguish drought from other weather events that make it difficult to detect, track and respond to drought.

Part of the difficulty in detecting drought is in the lack of an obvious onset of drought conditions. A drought develops slowly and can appear to mimic a normal spell of dry weather in the summer, a time of the year when dry weather is accepted and expected. Short-term rainfall shortages create problems for agricultural crops, livestock, urban landscapes and other activities that depend on stored soil moisture between rainfall events. We are accustomed to dealing with short-term dry spells in part because there is an expectation that rainfall is just around the corner. However, when rainfall shortages persist for weeks or months at a time, activities that depend on long-term storage of water will be adversely impacted as well. Droughts in Kentucky can have serious negative consequences for drinking water supplies, energy production, commercial and industrial operations, recreation and aquatic habitat.

The negative impacts of drought cannot be avoided but there are ways to reduce them to a manageable level. All water suppliers in the commonwealth should have a water shortage response plan to guide both the supplier and customer during a drought event. It is important for customers to listen to their water suppliers and be ready to take necessary actions to prevent a water shortage problem from developing. This is critical to a successful outcome because the only way to effectively manage the source of water supply is to first manage the demand for water.

There is no easy method for determining when a dry spell has become a drought, how long a drought will persist or how intense a drought may become. However, by closely tracking certain sources of information, referred to as drought indicators, it is possible to detect potential drought development early enough to allow at least some lead-time for notification and initiation of drought response preparations at the local level. The Division of Water monitors for the potential development of drought in Kentucky by tracking precipitation, streamflows, lake levels, groundwater and water supplies. There are also several tools that are useful in assessing the severity of a "dry spell" and the potential impacts to agriculture, forest

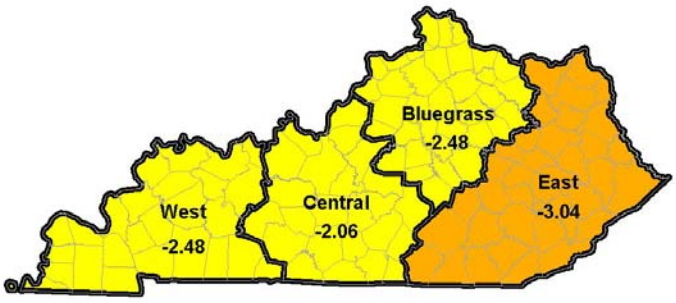
fires, water supplies and other vulnerabilities to drought. These tools include the Palmer Drought Severity Index, the Drought Monitor, the Standardized Precipitation Index and several others.

The Drought Monitoring pages will be updated on a weekly basis to provide timely information and assessments of current drought conditions in Kentucky. There will also be numerous links to other resources and drought information pages from various state and federal agencies.

Current for the week of June 11, 2007

Palmer Drought Severity Index The Palmer Drought Severity Index (PDSI) is compiled weekly by the Central Region Climate Prediction Center (National Centers for Environmental Prediction, National Weather Service and National Oceanic and Atmosphere Administration) and provided on the University of Kentucky Agricultural Weather Center's Web site. This index is useful for placing a developing drought into context with past droughts and serves as a measure of current conditions. The index also provides a standardized assessment of developing drought conditions that can be compared between different areas of the state or even between different states.

PDSI values can be categorized as follows:



- 0 to -0.99 = near normal
- -1.00 to -1.99 = mild drought
- -2.00 to -2.99 = moderate drought
- -3.00 to -3.99 = severe drought
- -4.00 and below = extreme drought

The Drought Monitor

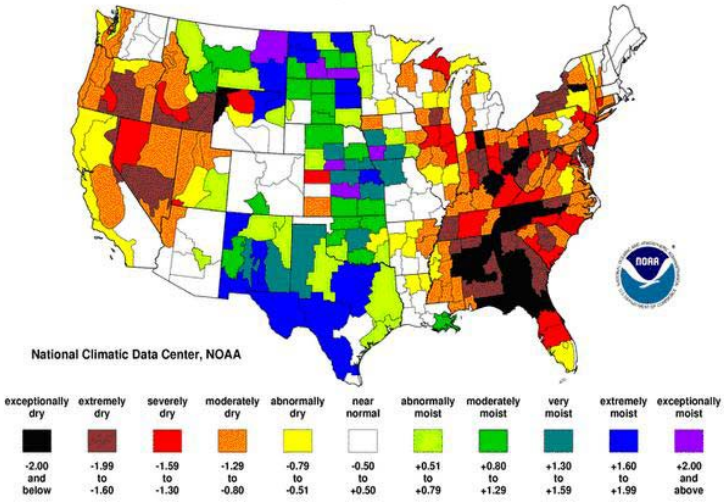
Tracking drought blends science and art. No single definition of drought works for all circumstances, so people rely on drought indices to detect and measure droughts. But no single index works under all circumstances, either. The Drought Monitor is a synthesis of multiple indices, outlooks and news accounts, that represents a consensus of federal and academic scientists.

The Standardized Precipitation Index

The Standardized Precipitation Index (SPI) is a way of measuring drought that is different from the PDI. Like the PDI, this index is negative for drought and positive for wet conditions. But the SPI is a probability index that considers only precipitation, while Palmer's indices are water balance indices that consider water supply (precipitation), demand (evapotranspiration) and loss (runoff).

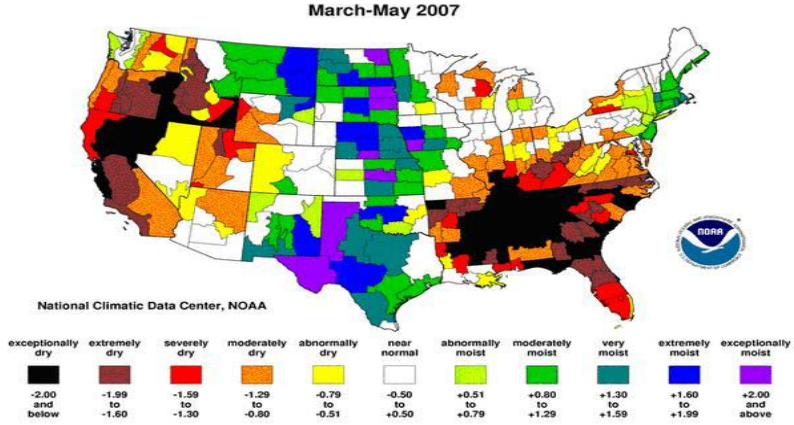
Standardized Precipitation Index
One Month

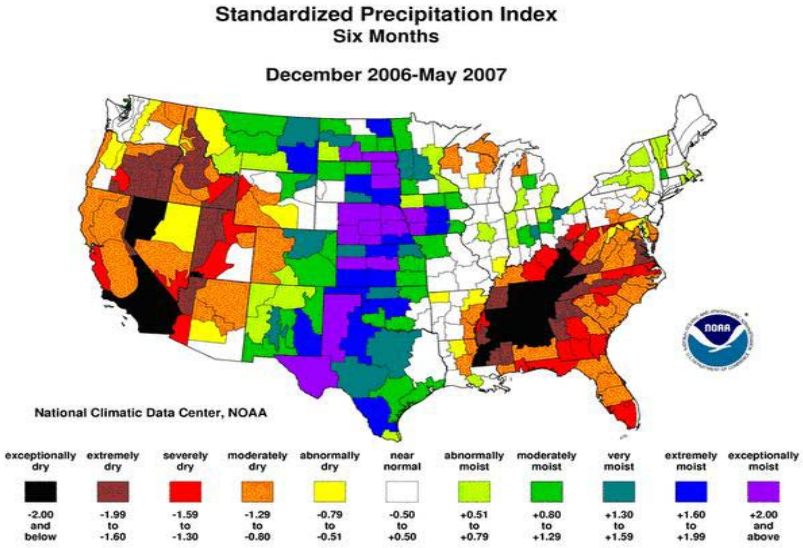
May 2007



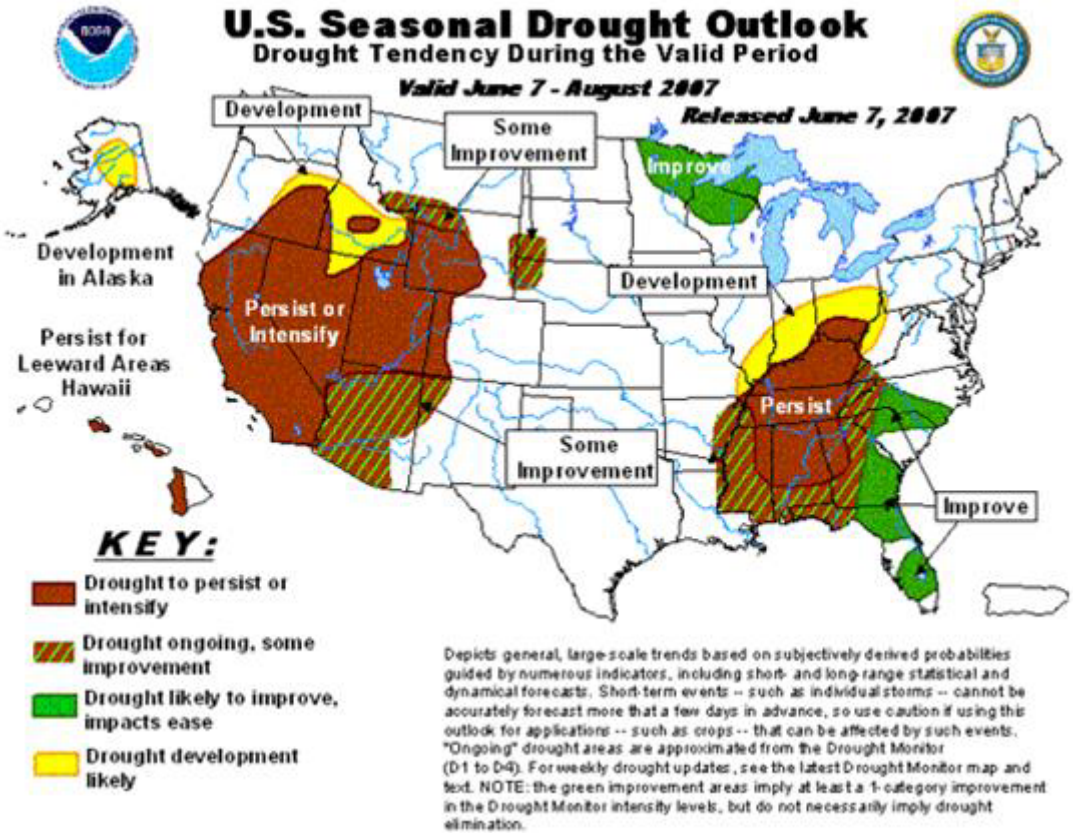
Standardized Precipitation Index
Three Months

March-May 2007





National Weather Service
U.S. Seasonal Drought Outlook



PRECIPITATION

Current for the week of June 11, 2007

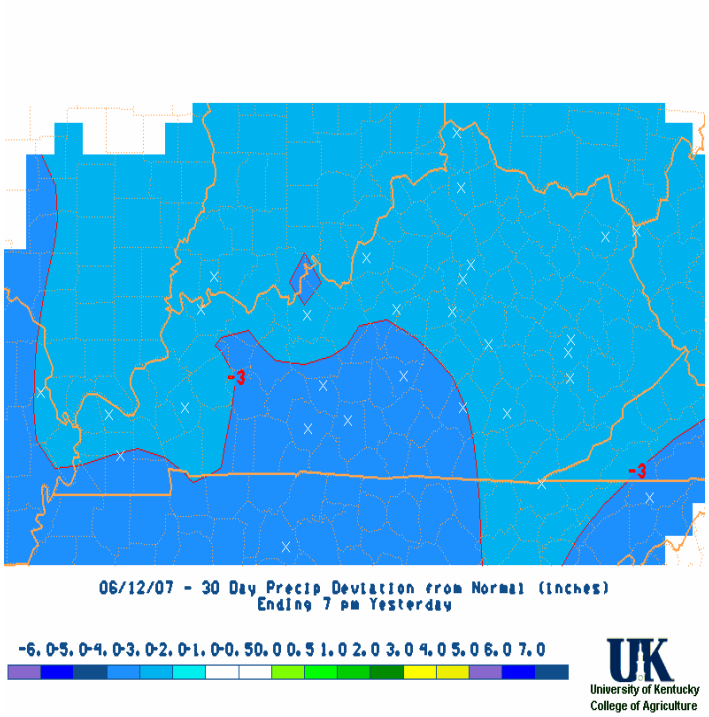
Precipitation: Data for the previous 30/60/90-day period and the Water Year Beginning October 01, 2006

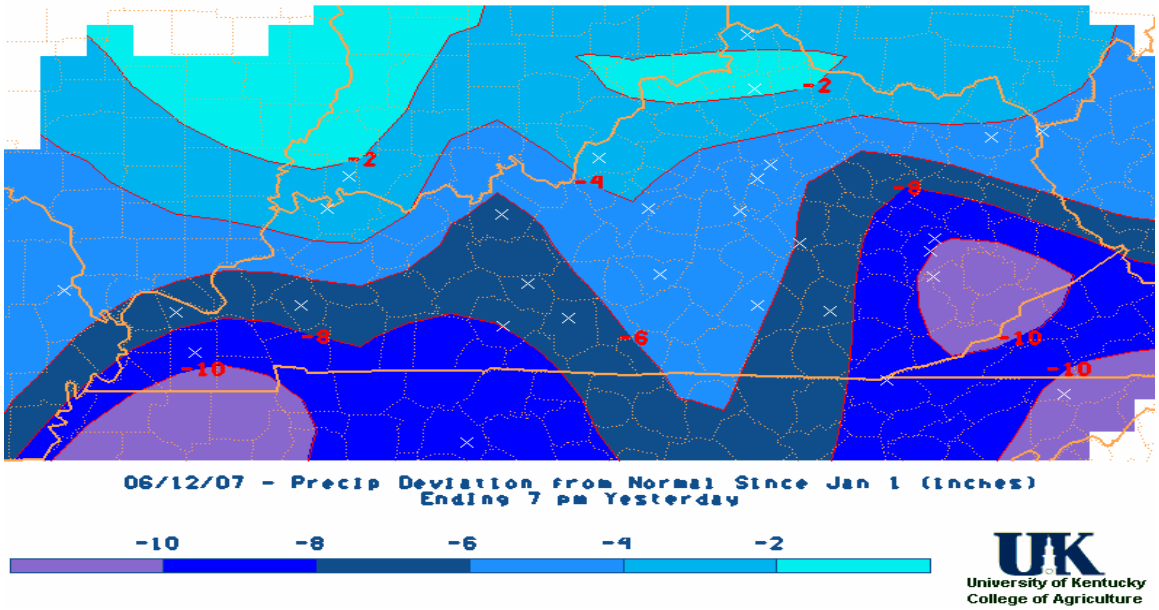
	Water Year		30/60/90 Day Total Precipitation and Departure From Normal					
Station	Precipitation Totals (inches)	Departure From Normal (inches)	30 Day Total (inches)	30 Day Departure (inches)	60 Day Total (inches)	60 Day Departure (inches)	90 Day Total (inches)	90 Day Departure (inches)
Henderson	32.27	1.35	1.29	-3.28	5.88	-2.85	9.26	-4.06
Paducah	33.68	-1.04	2.32	-2.63	5.75	-4.04	8.72	-5.87
Princeton	30.11	-6.18	2.05	-2.88	5.96	-3.64	8.32	-6.07
Mayfield	27.58	-10.52	0.60	-4.16	3.85	-5.93	5.75	-9.21
Louisville	30.34	0.04	1.19	-3.26	6.33	-2.39	9.31	-3.87
Bardstown	27.05	-2.41	0.61	-3.84	5.24	-3.16	8.62	-3.98
Hardinsburg	29.47	-4.05	1.24	-3.48	5.51	-3.58	7.82	-5.70
Campbellsville	29.07	-6.24	1.69	-3.51	7.53	-2.45	11.86	-2.88
Nolin Lake	30.33	-5.12	3.35	-1.90	8.12	-1.79	10.49	-3.60
Glasgow	27.72	-8.33	1.38	-3.63	6.30	-3.32	9.49	-4.98
Bowling Green	25.25	-10.23	2.58	-2.26	6.60	-2.63	7.55	-6.52
Covington	24.60	-3.06	0.92	-3.31	3.46	-4.58	6.07	-6.02
Williamstown	32.10	2.93	1.80	-2.53	5.99	-2.51	12.43	-0.56
Spindletop	21.72	-7.66	1.30	-3.07	4.69	-3.63	7.17	-5.35
Lexington	26.89	-2.48	2.22	-2.14	5.96	-2.35	8.75	-3.76
Dix Dam	24.47	-6.36	1.26	-3.38	5.62	-3.30	9.45	-3.70
Berea	24.11	-6.60	1.49	-3.28	5.69	-3.41	9.30	-3.93
Grayson	24.78	-2.65	1.82	-2.06	5.34	-2.71	8.35	-3.19
Jackson	21.76	-9.63	1.88	-2.52	4.27	-4.27	5.67	-7.06
Quicksand	20.38	-11.12	1.87	-2.65	4.21	-4.45	5.60	-7.24
Buckhorn Lake	18.13	-12.27	0.63	-3.51	3.84	-4.09	6.00	-6.04
London	21.97	-9.18	0.96	-3.29	5.88	-2.32	6.66	-5.77
Somerset	26.75	-7.78	1.30	-3.80	5.31	-4.23	7.63	-6.30
Cumberland Gap	20.80	-14.40	0.30	-4.44	4.62	-4.30	7.75	-5.93

Percent of Normal Precipitation for the Current Water Year Beginning October 01, 2007

Climatic Division	Normal (inches)	Percent of Normal Precipitation			
		Water Year	30 Day	60 Day	90 Day
Western (1)	35.01	89	32	57	56
Central (2)	33.65	85	35	70	67
Bluegrass (3)	29.52	87	34	61	69
Eastern (4)	31.66	70	29	56	54

The Division of Water monitors a network of 24 daily climate-reporting stations to track developing shortages of precipitation. Precipitation deficits for the water year range from 70 percent of normal in the Eastern climatic division to 90 percent of normal in the Western climatic division. Shorter term deficits are severe, ranging from 30 to 70 percent of normal within the past 90 days. Statewide, the combined rainfall for the months of February through May of this year rank as the second driest for the period since at least 1895 -- the first year of the instrumental record.



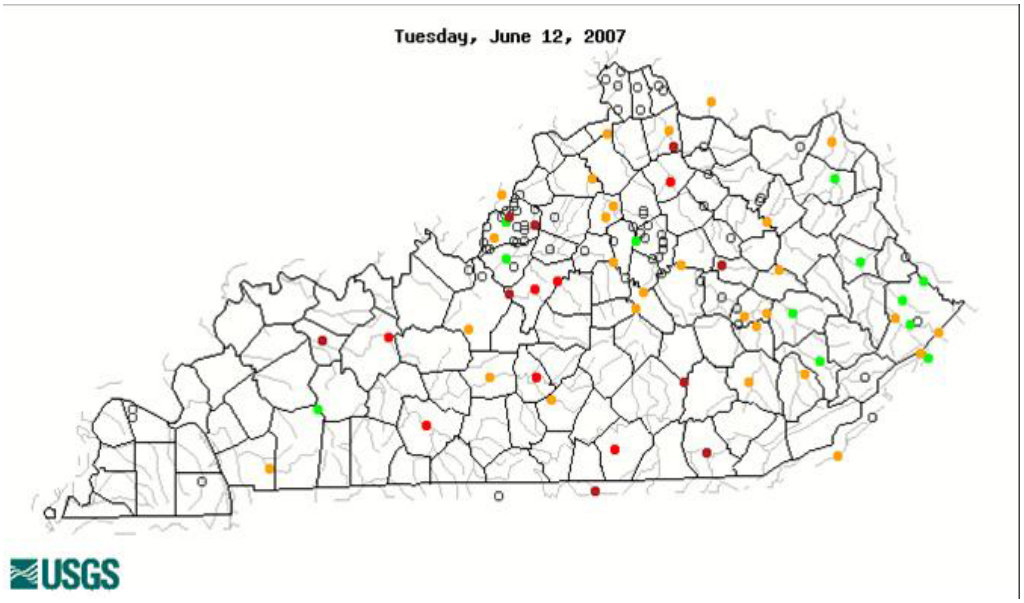


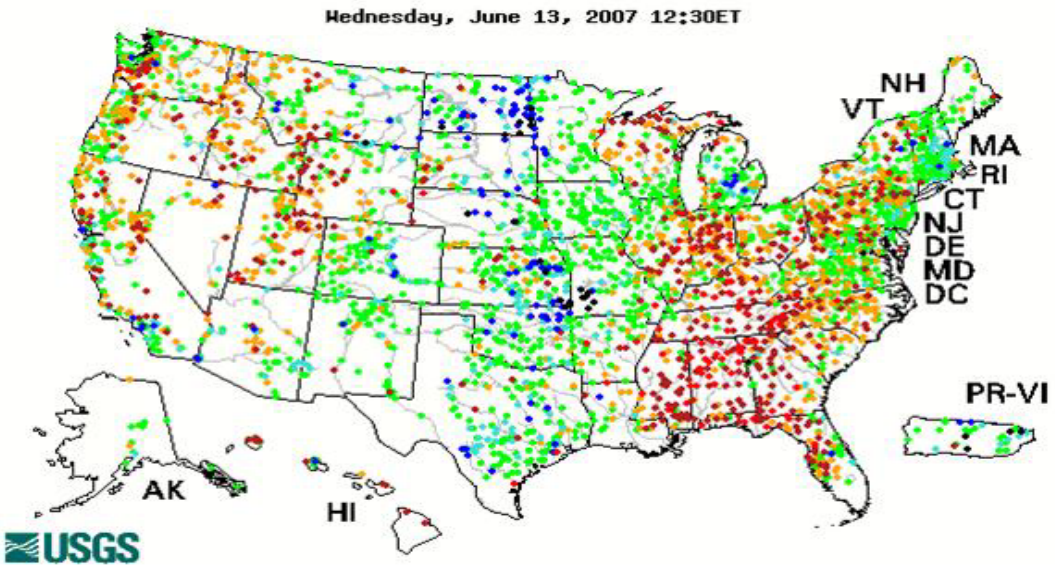
For the week of June 11, 2007, the precipitation deficit for the past 30 days ranges from 2 to 3 inches below normal across Kentucky. For the year, the largest deficits occur in the southern tiers of the Western and Eastern climatic divisions. Up to 10-inch deficits in precipitation have developed in parts of the Purchase area of the west and the headwaters of the Kentucky, Licking, Cumberland and Big Sandy river basins in the east. Central and northern Kentucky deficits range from 0 to 2 inches in the extreme north and 4 to 6 inches in the Bluegrass and parts of south-central Kentucky.

Hydrology

STREAMFLOWS

Current for the week of June 11, 2007





The U.S. Geological Survey maintains a real-time stream gauging network that monitors flows in all major river basins in Kentucky. Measurements of streamflow are a very good indicator of the longer-term hydrologic impacts of drought. During

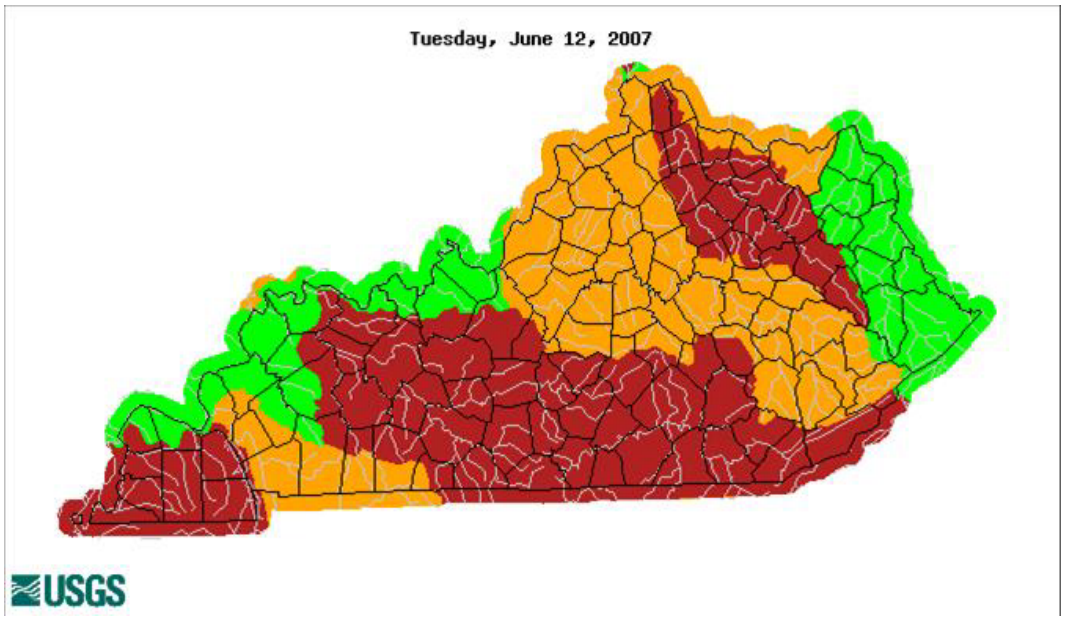
the developing stages of drought, streamflows provide valuable information on the severity and regional extent of emerging problems. Streamflow data is evaluated relative to the long-term record to determine drought intensity and identify potential problems associated with water shortages. Once a drought has matured, streamflow measurements are critical at many locations where water withdrawals have the potential to cause adverse environmental impacts to streams.

For the week of June 11 there are large areas of severely low flow but also some areas where flows are low but still within a normal range for this time of year. Current daily streamflows indicate normal to low-normal streamflow conditions in the Kentucky, Lower Cumberland, Mississippi, Tennessee, Big Sandy, Little Sandy and Tygarts River basins. Moderate to severe low flows are observed in the Upper Cumberland, Salt, Licking and Green River basins.

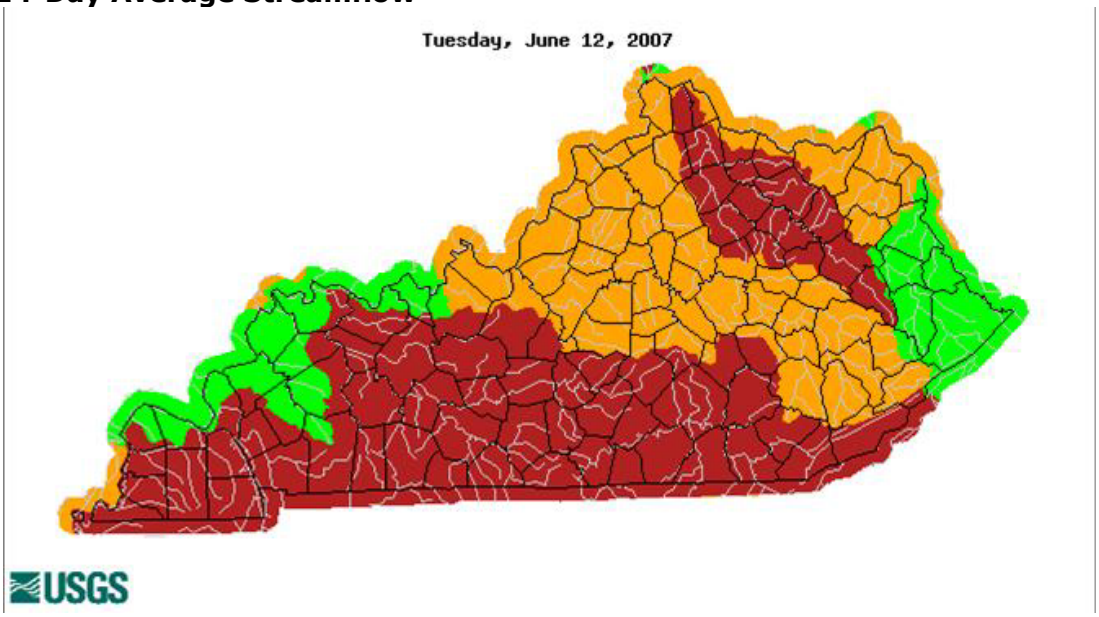
Weekly and Monthly Streamflow

For a slightly longer-term perspective of streamflow conditions across Kentucky, the United States Geological Survey computes average flows for the previous seven, 14 and 28 days. The resulting average streamflow values are categorized relative to the long-term record and assigned levels of severity based on the frequency that similar magnitudes of low flow have occurred in the past. By averaging over a period of several days to several weeks, the values on the map are more indicative of longer-term conditions than daily average or real-time streamflow measurements.

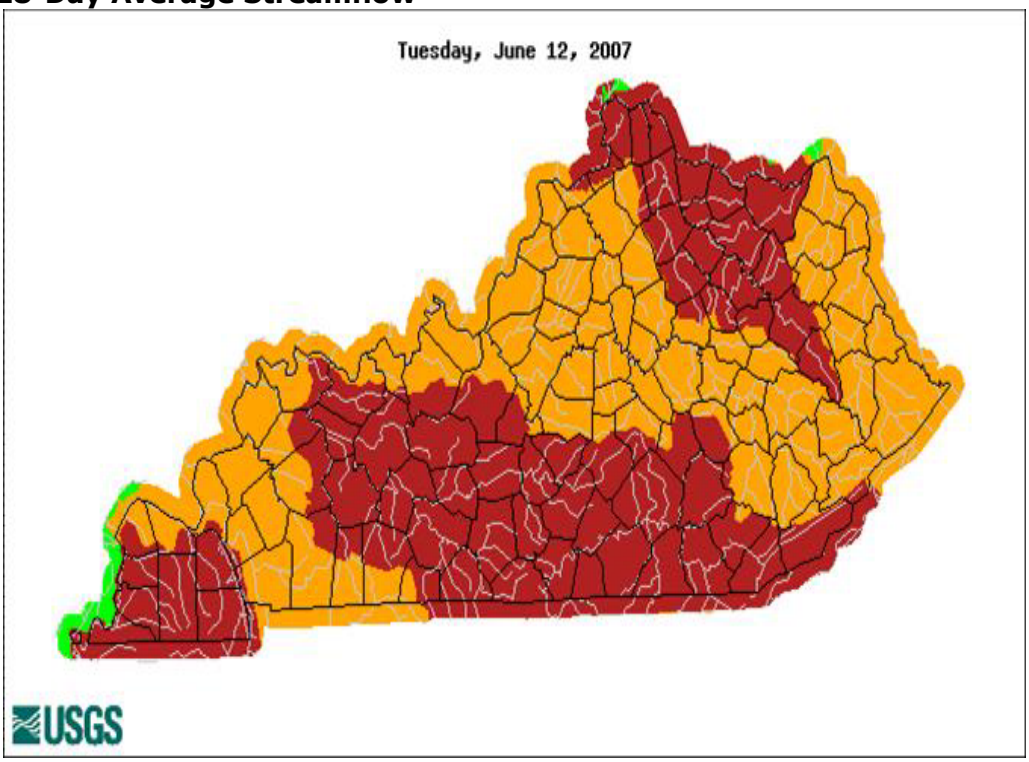
Seven-Day Average Streamflow



14-Day Average Streamflow



28-Day Average Streamflow



The long-term streamflow averages indicate areas of severe low flow occurring in the Licking, Upper Cumberland, Green, Tennessee and Mississippi River basins of Kentucky as well as some tributary flows to the Ohio River in an area stretching from Jefferson County to Lewis County.

Lakes and Reservoirs
U.S. Army Corps of Engineers Projects

Another useful measure of the impact that drought is having on a region is the status of area lakes and reservoirs. The Division of Water monitors data from 12 projects operated by the U.S. Army Corps of Engineers (USACE) from three USACE districts: Louisville, Huntington and Nashville. These projects strive to maintain reservoirs at pool levels consistent with the operating guidelines as part of the larger mission of flood control and navigation in the Ohio and Mississippi rivers. Beginning in April, the releases from the reservoirs are managed to allow filling to the "normal summer pool elevation." Significant precipitation deficits in the basin above the reservoir can adversely affect the attainment of normal summer pool elevation. This, in turn, may result in low flows in the river below the project when releases from the reservoir are reduced to the minimum needed for water quality and aquatic habitat.

By examining the data for "current pool elevation" and "current outflow," valuable information about the status of large headwater areas above the USACE reservoirs can be obtained.

United States Army Corps of Engineer Reservoir Information
Updated June 8, 2007

Basin	Project	Current Outflow (cfs)	Normal Summer Pool Elevation (ft)	Current Pool Elevation (ft)
Little Sandy	Grayson	25.9	645.0	644.6
Big Sandy	Dewey	41.0	650.0	650.8
	Fishtrap	168.9	757.0	757.5
	Yatesville	25.4	630.0	630.2
	Paintsville	21.8	709.0	709.6
Licking	Cave Run	70.0	730.0	730.2
Kentucky	Carr Creek	17.0	1027.0	1027.5
	Buckhorn	115.0	782.0	782.4
Salt	Taylorsville	50.0	547.0	546.4
Green	Green River	49.0	675.0	675.0
	Nolin	49.0	515.0	515.3
	Barren River	51.0	552.0	544.4
	Rough River	49.0	495.0	493.1

For the week of June 11, 2007, reservoir levels remain below the normal summer pool elevation at Taylorsville Lake in Spencer County, Barren River Lake in Barren County and Rough River Lake in Breckinridge County. Lake levels and outflows are good indicators of moderate to severe drought conditions in these areas. It is noteworthy that both Barren River and Rough River lakes have been at or near the minimum release since mid-March, further evidence that the current drought conditions have been under development for some time.

Small Lakes and Water Supply Reservoirs

Water suppliers who rely on small reservoirs are acutely aware of any deviation from normal when it comes to the amount of water in their reservoir. As with the larger USACE projects, these small reservoirs are susceptible to drought impacts that can inhibit the "refilling" or "recharge" over winter and through the spring. In addition, the daily withdrawal of water for water supply can accelerate the drop in water levels so that the ability to withstand long periods of little or no precipitation is compromised.

The Division of Water will monitor selected small water supply reservoirs when conditions indicate that water supplies may be threatened by persistent drought. For the week of June 11, 2007, no reports of abnormally low reservoir levels have been reported.